

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference METSO 8 PCT	FOR FURTHER ACTION		See Form PCT/PEA/416
International application No. PCT/FI2004/000005	International filing date (<i>day/month/year</i>) 08.01.2004	Priority date (<i>day/month/year</i>) 09.01.2003	
International Patent Classification (IPC) or national classification and IPC D21G7/00			
Applicant METSO PAPER, INC. et al.			
<ol style="list-style-type: none"> 1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of 5 sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising: <ol style="list-style-type: none"> a. <input checked="" type="checkbox"/> <i>sent to the applicant and to the International Bureau</i> a total of 2 sheets, as follows: <div style="margin-left: 20px;"> <input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). <input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box. </div> b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions). 			
<ol style="list-style-type: none"> 4. This report contains indications relating to the following items: <div style="margin-left: 20px;"> <input checked="" type="checkbox"/> Box No. I Basis of the opinion <input type="checkbox"/> Box No. II Priority <input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability <input type="checkbox"/> Box No. IV Lack of unity of invention <input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement <input type="checkbox"/> Box No. VI Certain documents cited <input type="checkbox"/> Box No. VII Certain defects in the international application <input type="checkbox"/> Box No. VIII Certain observations on the international application </div> 			
Date of submission of the demand 02.08.2004	Date of completion of this report 07.12.2004		
Name and mailing address of the international preliminary examining authority: <div style="display: flex; align-items: center;"> <div> European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 </div> </div>		Authorized Officer Helpiö, T. Telephone No. +49 89 2399-7495	



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International application No.
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Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☒ This report is based on translations from the original language into the following language English, which is the language of a translation furnished for the purposes of:
- ☒ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-9 as published

Claims, Numbers

1-15 filed with telefax on 04.11.2004

Drawings, Sheets

1/2-2/2 as published

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-15
	No: Claims	
Inventive step (IS)	Yes: Claims	1-15
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-15
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

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Re Item I

The characterizing part of claim 1 should obviously read as:

"...characterized **by** applying a spray .."

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

- 1 Reference is made to the following documents:
D1: US-B1-6 248 407 (HESS HARALD) 19 June 2001 (2001-06-19)
D2: US-B1-6 309 463 (HESS HARALD ET AL) 30 October 2001 (2001-10-30)
- 2 The document D2 is regarded as being the closest prior art to the subject-matter of claim 1, and discloses (cf. especially column 5, line 32 - column 7, line 6; figures):

"A method for moistening a web (16) of paper or paperboard, the method comprising the step of forming a steam atmosphere into a steam blow cavity (32b, 34b) open toward the web (16) by way of feeding steam into the cavity (32b, 34b)". (cf. preamble of claim 1).

The subject-matter of claim 1 therefore differs from this known method in that it further comprises the step of:

"applying a spray of liquid heated to a temperature higher than the ambient temperature from at least one nozzle onto the web in the steam atmosphere".

The problem to be solved by the present invention may therefore be regarded as providing an improved method for moistening a paper web which allows an atomized liquid to reach the web surface without excessive cooling or evaporation.

Document D2 does not disclose the application of a spray of liquid onto the web. Document D1 discloses (cf. especially column 1, line 41 - column 2, line 14;

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column 3, line 59 - column 5, line 25; figures) a method for applying a coating medium as a spray in a steam atmosphere onto a paper web. D1 does not, however, disclose "a liquid heated to a temperature higher than the ambient temperature". Heating the liquid above the ambient temperature is, however, an essential feature of the current invention. Spraying unheated, relatively cold water into a steam atmosphere would cool the heated space and cause a risk for condensation and formation of big droplets which would have a negative influence on the surface properties of the web.

There is no indication in D1 or D2, or in any other document cited in the International search report, which would lead the skilled person, faced with the above problem, to modify and/or combine their teachings and thereby arrive to the subject-matter of claim 1. Therefore, claim 1 appears to satisfy the requirements of Article 33 PCT with regard to novelty and inventive step.

- 3 The same reasoning applies, mutatis mutandis, to the subject-matter of the corresponding independent claim 11, which is therefore also considered to satisfy the requirements of Article 33 PCT with regard to novelty and inventive step.
- 4 Dependent claims 2-10 and 12-15 add further features to the independent claims and as such they also meet the requirements of the PCT with respect to novelty and inventive step.

What is claimed is:

1. A method for moistening a web of paper or paperboard, the method comprising the step of forming a steam atmosphere into a steam blow cavity open toward the web (1) by way of feeding steam into the cavity, **characterized** applying a spray of liquid heated to a temperature higher than the ambient temperature from at least one nozzle onto the web in the steam atmosphere.
2. The method of claim 1, **characterized** in that the temperature of the liquid applied as a spray is particularly advantageously in the range of 70 – 95 °C.
3. The method of claim 1, **characterized** in that the temperature of the liquid applied as a spray is in the range of 30 – 99 °C.
4. The method of claim 1, 2 or 3, **characterized** in that the steam and the liquid required for establishing the steam atmosphere are injected from the same nozzle.
5. The method of claim 1, 2 or 3, **characterized** in that the steam and the liquid required for establishing the steam atmosphere are injected from separate nozzles.
6. The method of any one of foregoing claims, **characterized** in that into the cavity open toward the web is formed an atmosphere of saturated steam.
7. The method of any one of foregoing claims, **characterized** in that the steam is water vapor and the liquid is water.
8. The method of any one of foregoing claims, **characterized** in that the temperature of the liquid being applied as a spray is controlled in the cross-machine (CD) direction.
9. The method of any one of foregoing claims, **characterized** in that the amount of

the liquid being applied as a spray is controlled in the cross-machine (CD) direction.

10. The method of any one of foregoing claims 8 - 9, **characterized** in that the temperature or flow rate of the liquid being applied as a spray is adjusted in the cross-machine (CD) direction with the help of a control system and measurements performed on the web.

11. An assembly for moistening a web of paper or paperboard, the assembly comprising a steam blow cavity adapted to open toward a moving web (1) and at least one nozzle (5, 6, 7) for feeding at least steam into the steam blow cavity so as to form a steam atmosphere, **characterized** by at least one nozzle (5, 6, 7) for applying a spray of a liquid heated to a temperature higher than the ambient temperature onto the web (1) in the steam atmosphere.

12. The assembly of claim 11, **characterized** in that that at least one of the nozzles is a dual-channel nozzle (FIG. 4) capable of injecting both steam and liquid.

13. The assembly of claim 11, **characterized** by the use of separate nozzles for injecting steam and liquid.

14. The assembly of any one of claims 11 - 13, **characterized** by means adapted to the nozzles for heating the injected therefrom and controlling the temperature of the injected liquid.

15. The assembly of any one of claims 11 - 14, **characterized** in that the assembly is located on the dryer section, calender or therebetween of a paper/paperboard manufacturing line.